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Warringah Golf Clubhouse

DA Acoustic Assessment

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2	29/08/2023	20221047.1/2908A/R2/PF	PF		PF

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1 INTRODUCTION

This report has been prepared to assess noise impacts associated with the proposed new club house development located at to 433 Pittwater Road, North Manly, known as Warringah Recreation Centre.

This document addresses noise impacts assessed with the following:

- Noise emission from the proposed operation of the club house. This will include patron activity and music within the club house, and
- Noise emissions from mechanical plant to service the project site (in principle).

Acoustic Logic (AL) have utilised the following documents and regulations in the assessment of external noise emission criteria for the development:

- North Beaches Council *Pre-DA meeting advice on Noise*, 25/07/2022
- North Beaches Council *Warringah Development Control Plan* (DCP) 2011, and
- The Environmental Protection Authority (EPA) *NSW Noise Policy for Industry* (NPI) 2017

This assessment has been conducted based on the architectural drawings provided to AL, prepared by Group Architects, dated 18.03.2022.

2 SITE DESCRIPTION

The proposed new club house will be located adjacent to the golf course in the Warringah recreation area in the northern corner of the land bounded by Kentwell Road and Pittwater Road, North Manly.

The proposed club will be comprised of:

- Two storey community-based club house providing office, meal, bar and function services with a maximum occupancy of 320 patrons (including staff)

- The proposed operation hours for each space are detailed in Warringah Golf Club documentation '*Plan of Management September 2022*' and has been reproduced below:

Day	Hours of Operation	Days Open
Pro Shop	Winter 6:30am-6pm Summer 6am-7pm	Monday-Sunday
Commercial office/meeting	9am-5pm	Monday-Friday
Garden Lounge	7am-10pm	Monday-Sunday
Dining & function Rooms	12pm-10pm	Monday-Sunday
Bar	10am-10pm	Monday-Sunday

- The major noise sources are the use of garden lounge (including an outdoor terrace), dining & function rooms and bar

The proposed site plan is presented in Figure 2.

A site survey has been carried out by this office to identify surrounding noise sensitive receivers and the existing acoustic environment. It is noted that the site is located within Warringah recreation area and residential receivers are identified to the northeast across Pittwater Road. Nearest sensitive receivers are as follows:

- **R1: Residential Receiver 1**: Residential houses to the north of the project site at 518-528 Pittwater Road, North Manly.
- **C1: Commercial Receiver 1**: Mixed use buildings to the east of the project site at 512 Pittwater Road and 3 Corrie Road, North Manly.

A site map, measurement locations and surrounding receiver are presented in Figure 1

Figure 1 – Project Site and Noise Measurement (Source from: Six Map NSW)

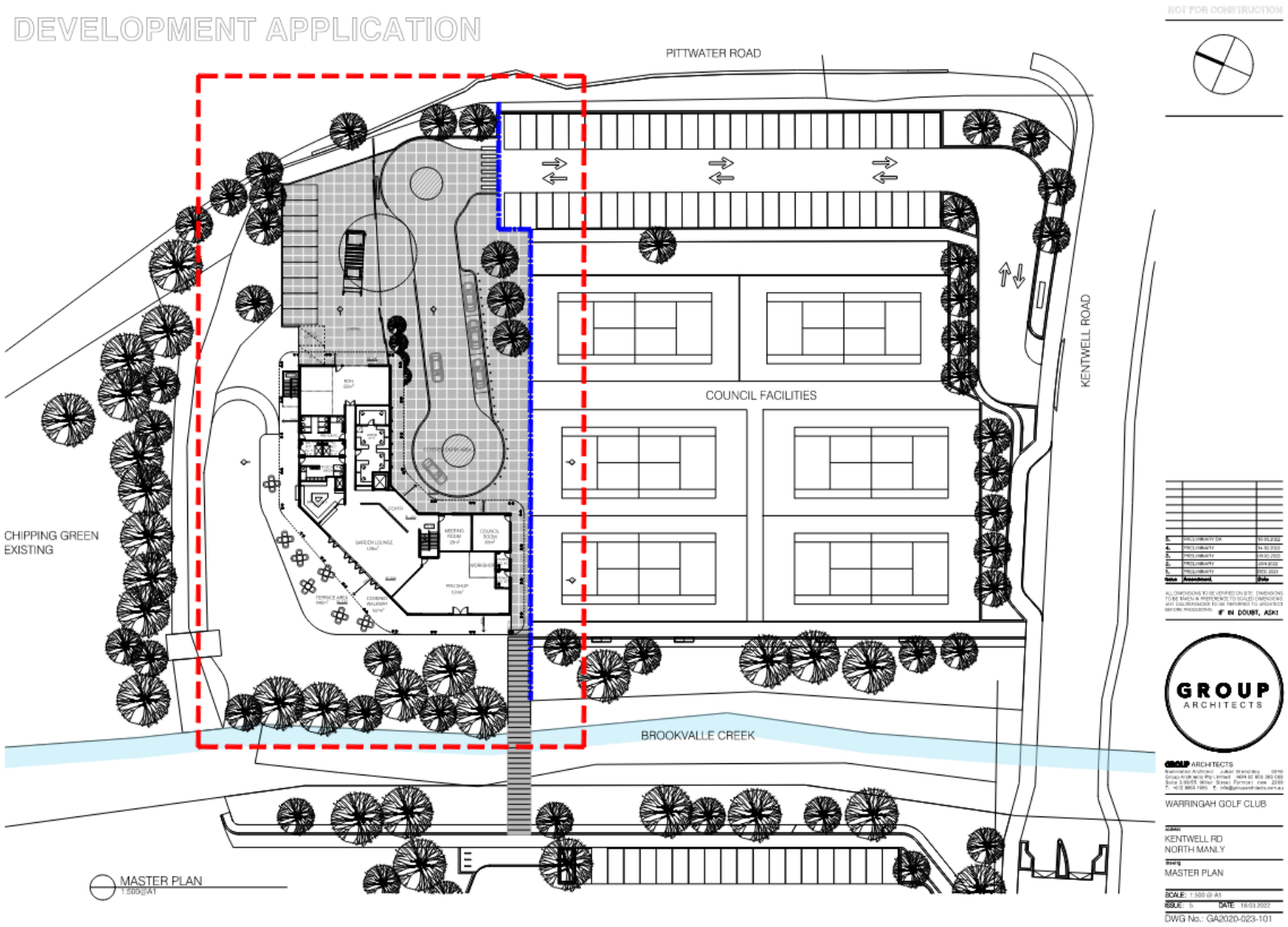


Figure 2 – Site Plan (sourced from Group Architects)

3 NOISE DESCRIPTORS

Ambient noise constantly varies in level from moment to moment, so it is not possible to accurately determine prevailing noise conditions by measuring a single, instantaneous noise level.

To quantify ambient noise, a 15 minute measurement interval is typically utilised. Noise levels are monitored continuously during this period, and then statistical and integrating techniques are used to characterise the noise being measured.

The principal measurement parameters obtained from the data are:

L_{eq} - represents the average noise energy during a measurement period. This parameter is derived by integrating the noise levels measured over the measurement period. L_{eq} is important in the assessment of noise impact as it closely corresponds with how humans perceive the loudness of time-varying noise sources (such as traffic noise).

L_{90} – This is commonly used as a measure of the background noise level as it represents the noise level heard in the typical, quiet periods during the measurement interval. The L_{90} parameter is used to set noise emission criteria for potentially intrusive noise sources since the disturbance caused by a noise source will depend on how audible it is above the pre-existing noise environment, particularly during quiet periods, as represented by the L_{90} level.

L_{10} is used in some guidelines to measure noise produced by an intrusive noise source since it represents the average of the loudest noise levels produced at the source. Typically, this is used to assess noise from licenced venues.

L_{max} is the highest noise level produced during a noise event, and is typically used to assess sleep arousal impacts from short term noise events during the night. It is also used to assess internal noise levels resulting from aircraft and railway ground vibration induced noise.

L_1 is sometimes used in place of L_{max} to represent a typical noise level from a number of high level, short term noise events.

4 ENVIRONMENTAL NOISE SURVEY

4.1 MEASUREMENT LOCATION

One unattended noise monitor was located at the north boundary of the site facing golf course. Refer to Figure 1 for detailed location. Attended measurements were conducted to the north east of the project site on Pittwater Road.

4.2 MEASUREMENT PERIOD

Unattended noise monitoring was conducted from Thursday 1st of September 2022 to Monday 12th of September 2022. Attended measurements were conducted on Thursday 1st of September 2022 between 4:00 pm – 5:00 pm.

4.3 MEASUREMENT EQUIPMENT

Unattended noise monitoring was conducted using one Acoustic Research Laboratories Pty Ltd noise logger. The logger was set to A-weighted fast response mode and was programmed to store 15-minute statistical noise levels throughout the monitoring period. The equipment was calibrated at the start and end of the monitoring period using a Rion NC-73 calibrator. No significant drift was noted.

Attended noise measurements were conducted using a Norsonic 140 Sound Analyser. The analyser was set to fast response and calibrated before and after the measurements using a Norsonic Sound Calibrator type 1251. No significant drift was noted.

4.4 SUMMARISED RATING BACKGROUND NOISE LEVELS

NSW EPA's RBL assessment procedure requires determination of background noise levels for each day (the ABL) then the median of the individual days as set out for the entire monitoring period.

Appendix A provides detailed results of the unattended noise monitoring. Weather affected data was excluded from the assessment. The processed Rating Background Noise Levels (lowest 10th percentile noise levels during operation time period) are outlined in the table below.

Table 1 – Rating Background Noise Levels

Time of Day	Measured Background Noise Level dB(A)$L_{90(period)}$
Morning Shoulder (6am – 7am)	46
Day (7am – 6pm)	51
Evening (6pm – 10pm)	46

The following background noise spectrum for day and evening time is obtained based on attended measurements and unattended noise monitoring:

Table 2 – Summarised Background Noise Spectrum dB(A) $L_{90, 15mins}$

Time of Day	31.5Hz	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	A-wt
Day	55	56	51	48	45	48	44	35	24	**51**
Evening	50	51	46	43	40	43	39	30	19	**46**

5 NOISE EMISSION CRITERIA

Noise emissions from the proposed club house tenancy will be assessed to comply with the criteria outlined in the following documents/regulations:

- North Beaches Council *Pre-DA meeting advice on Noise*, 25/07/2022
- NSW Liquor & Gaming requirements, and
- The Environmental Protection Authority (EPA) *NSW Noise Policy for Industry* (NPI) 2017

5.1 NORTH BEACHES COUNCIL – PRE-DA MEETING ADVICE ON NOISE

Noise

Licenced premises have the potential to cause noise impacts on surrounding residential receptors through patron noise and noise from mechanical plant. There are a number of potential residential receptors located on the northern side of Pittwater Road.

As such, to support any submitted application, Environmental Health would typically require a Noise Assessment by a suitably qualified and experienced acoustic engineer be submitted with the application. Any submitted acoustic assessment is to be in accordance with relevant standards and guidelines including NSW EPA's Noise Policy for Industry. The acoustic assessment should include an assessment of all the potential noise sources from the club house including but not limited to:

- *Noise from patrons including use of the outdoor terrace*
- *Noise from amplified music/live music; and*
- *Noise from mechanical plant.*

In accordance with the North Beaches Council *Pre-DA meeting advice on Noise*, 25/07/2022, noise emissions from mechanical plant and the car park will be assessed against the NSW Noise Policy for Industry.

Noise emissions from club house operation (patrons, music, etc) is to be assessed against the NSW Liquor and Gaming requirements, detailed below.,

5.2 NSW LIQUOR & GAMING

NSW Liquor & Gaming requirements are as follows:

- *The L_{10} noise level emitted from the premises shall not exceed 5dB above the background L_{90} sound level in any Octave Band Centre Frequency (31.5kHz to 8kHz inclusive) between the hours of 7.00am to 12.00 midnight when assessed at the boundary of the nearest affected residential premises.*
- *L_{10} noise level emitted from the premises shall not exceed the background L_{90} sound level in any Octave Band Centre Frequency (31.5kHz to 8kHz inclusive) after midnight when assessed at the boundary of the nearest affected residential premises.*

After midnight, noise emissions from the Place of Public Entertainment are to be inaudible within any habitable rooms in nearby residential properties.

5.3 NSW EPA INDUSTRIAL NOISE POLICY FOR INDUSTRY 2017

For noise emissions associated with the car park and mechanical plant, the NSW EPA Noise Policy for Industry has been adopted.

The EPA NPI has two criteria which both are required to be satisfied, namely Intrusiveness and amenity. The NPI sets out acceptable noise levels for various localities. The policy indicates four categories to assess the appropriate noise level at a site. They are rural, suburban, urban and urban/industrial interface. Under the policy the nearest residential receivers would be assessed against the urban criteria.

Noise levels are to be assessed at the property boundary or nearby dwelling, or at the balcony or façade of an apartment.

5.3.1 Intrusiveness Criterion

The guideline is intended to limit the audibility of noise emissions at residential receivers and requires that noise emissions measured using the L_{eq} descriptor not exceed the background noise level by more than 5dB(A). The intrusiveness criteria applicable to the development are presented in the table below.

Table 3 – NPfI Intrusiveness Criteria

Time of Day	Rating background Noise Level dB(A)$L_{90(15min)}$	Intrusiveness Criteria dB(A) $L_{eq(15min)}$
Morning shoulder (6am - 7am)	46	51
Day (7am – 6pm)	51	56
Evening (6pm – 10pm)	46	51

5.3.2 Project Amenity Criterion

The guideline is intended to limit the absolute noise level from all noise sources to a level that is consistent with the general environment.

The EPA's NPI sets out acceptable noise levels for various localities. The recommended noise amenity area is based upon the measured background noise levels at the sensitive receiver. Based on the measured background noise levels detailed in Section 4.4, the Noise Policy for Industry suggests the adoption of the 'urban' categorisation.

The NPI requires project amenity noise levels to be calculated in the following manner:

$L_{Aeq,15min}$ = *Recommended Amenity Noise Level – 5 dB(A) + 3 dB(A)*

The amenity levels appropriate for the commercial receivers surrounding the site are presented below.

Table 4 – EPA Amenity Noise Levels

Type of Receiver	Time of day	Recommended Noise Level dB(A)$L_{eq(period)}$	Project Amenity Noise Level dB(A)$L_{eq(15\ minute)}$
Residential (Urban)	Morning Shoulder	45	43
	Day	60	58
	Evening	50	48
Commercial	When in Use	65	63

The NSW EPA Noise Policy for Industry (2017) defines:

- Day as the period from 7am to 6pm Monday to Saturday and 8am to 6pm Sundays and Public Holidays.
- Evening as the period from 6pm to 10pm.
- Night as the period from 10pm to 7am Monday to Saturday and 10pm to 8am Sunday and public holidays.

5.3.3 Sleep Arousal Criteria

The Noise Policy for Industry recommends the following noise limits to mitigate sleeping disturbance:

Where the subject development / premises night -time noise levels at a residential location exceed:

- *$L_{eq,15min}$ 40 dB(A) or the prevailing RBL plus 5 dB, whichever is the greater, and/or*
- *L_{Fmax} 52 dB(A) or the prevailing RBL plus 15 dB, whichever is the greater,*

a detailed maximum noise level even assessment should be undertaken.

Table 5-5 – Sleep Arousal Criteria for Residential Receivers

Receiver	Rating Background Noise Level (Night) dB(A)L_{90}	Emergence Level
Residences Surrounding Site Morning Shoulder (6am – 7am)	46 dB(A) L_{90}	51 dB(A)$L_{eq,\ 15min}$; 61 dB(A)L_{Fmax}

5.4 SUMMARISED NOISE EMISSION CRITERIA

Based on the noise emission criteria detailed above, a summary of the noise emission criteria for the usage of the proposed premises are presented below. For licensed spaces, the noise emission criteria for patron and music noise between 10:00am -10:00pm is presented in the table below.

Table 6 – Summarised Patron/Music Noise Emission Goals – Residential Receivers (External)

Time of Day	31.5Hz	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	A-wt
Day 7am-6pm (BG + 5)	60	61	56	53	50	53	49	40	29	**56**
Evening 6pm-10pm (BG + 5)	55	56	51	48	45	48	44	35	24	**51**

For the entire proposed development, the noise emission criteria for any proposed new mechanical plant and the car park are summarised below:

Table 7 – Noise Emissions Criteria – Mechanical Noise to Surrounding Receivers

Location	Time Period	Assessment Background Noise Level dB(A)L_{90}	Project Amenity Criteria dB(A) L_{eq}	Intrusiveness Criteria $L_{eq(15min)}$	NPI Criteria for Sleep Disturbance
Nearby Residences – Suburban Receiver	Moring Shoulder	46	**43**	51	51 dB(A)$L_{eq, 15min}$; 61 dB(A)L_{Fmax}
	Day (7am-6pm)	51	58	**56**	N/A
	Evening (6pm-10pm)	46	**48**	51	N/A
Nearby commercial receivers	When in use	65	**63**	N/A	N/A

The project noise trigger levels are indicated by the bolded values in the table above.

6 NOISE EMISSION ASSESSMENT

Noise emissions from the site are addressed for the following noise sources:

- Patron and background music noise from the proposed licensed premises,
- Use of the car park; and
- Mechanical plant noise in principle.

6.1 PATRON/MUSIC NOISE

This section of the report examines the potential noise impacts from patron noise from the proposed tenancy. The major potential noise sources are from the use of following licensed spaces:

- Ground floor garden lounge and outdoor terrace to the west of the development, and
- First floor dining, function and sports bar to the north and west of the development.

The emission levels present within this assessment were corrected for distance attenuation and barrier effects (building shielding) where applicable.

Predicted noise levels from patron noise have been assessed using the following assumptions:

- There is a maximum capacity of 320 people using the facility (including patron and staff) and it is assumed the max capacity at all times during the operation (10:00am -10:00pm)
- The distribution of the number of patrons & staff is assumed as follows to present a conservative assessment:
    - Ground floor outdoor terrace: 50
    - Ground floor indoor garden lounge: 100
    - First floor dining/ function: 60
    - First floor function: 60, and
    - First sports bar: 50

    The number of patrons presented above is a conservative assumption as all spaces will not operate at full capacity for normal operation of the club house. In the case that the above assumption complies with the criteria, all other conditions will comply with the criteria.
- Patron noise is subject to 1 in 3 patrons talking at a moderately loud level at any one time. A sound power level of 77dB(A)L_{10} was used for patron voice levels for this assessment, see table below

Table 8 – Patron Speech Spectrum

Noise Level dB(A) – Frequency (Hz)									
31.5Hz	**63Hz**	**125Hz**	**250Hz**	**500Hz**	**1kHz**	**2kHz**	**4kHz**	**8kHz**	**A-weighted**
62	62	67	70	74	75	70	51	48	**77**

- Music within the internal spaces is assumed to be limited to background music, creating a spatially averaged sound pressure level of 75dB(A), see table below

Table 9 – Music Spectrum

Noise Level dB(A) – Frequency (Hz)									
31.5Hz	**63Hz**	**125Hz**	**250Hz**	**500Hz**	**1kHz**	**2kHz**	**4kHz**	**8kHz**	**A-weighted**
71	71	77	73	72	71	66	57	59	**75**

- The recommendations set out in Section 7 of this report have been implemented.

6.1.1 SoundPlan Modelling

Noise levels have been predicted at the receiver locations using SoundPlan™ 8.0 modelling software implementing the ISO 9613-2:1996 "Acoustics – Attenuation of Sound During Propagation Outdoors – Part 2: General Method of Calculation" noise propagation standard.

Noise enhancing meteorological have been adopted as recommended by the NPI, noting that the ISO 9613 modelling approach assumes that all receivers are 'downwind' (i.e., that noise enhancing wind conditions are in effect at all times).

The following figures detail computational noise modelling for closest noise sensitive receivers and façades relating to the operational noise emissions of the site through the presentation of a façade noise map onto the respective buildings and a grid noise map at 1.5m above the digital ground model. Numerical results are presented in the section below.

Ground absorption was conservatively calculated with a ground factor of 0 for all roads and golf course fronting the site with a ground factor of 0.6 as recommended in *Engineering Noise Control* (Bies & Hanson).

In line with Factsheet C of the NPI, penalties for annoying noise characteristics should be applied at the receiver, where applicable. Based on the predicted noise levels, no penalty should be applied (either for tonality, intermittency, or otherwise).

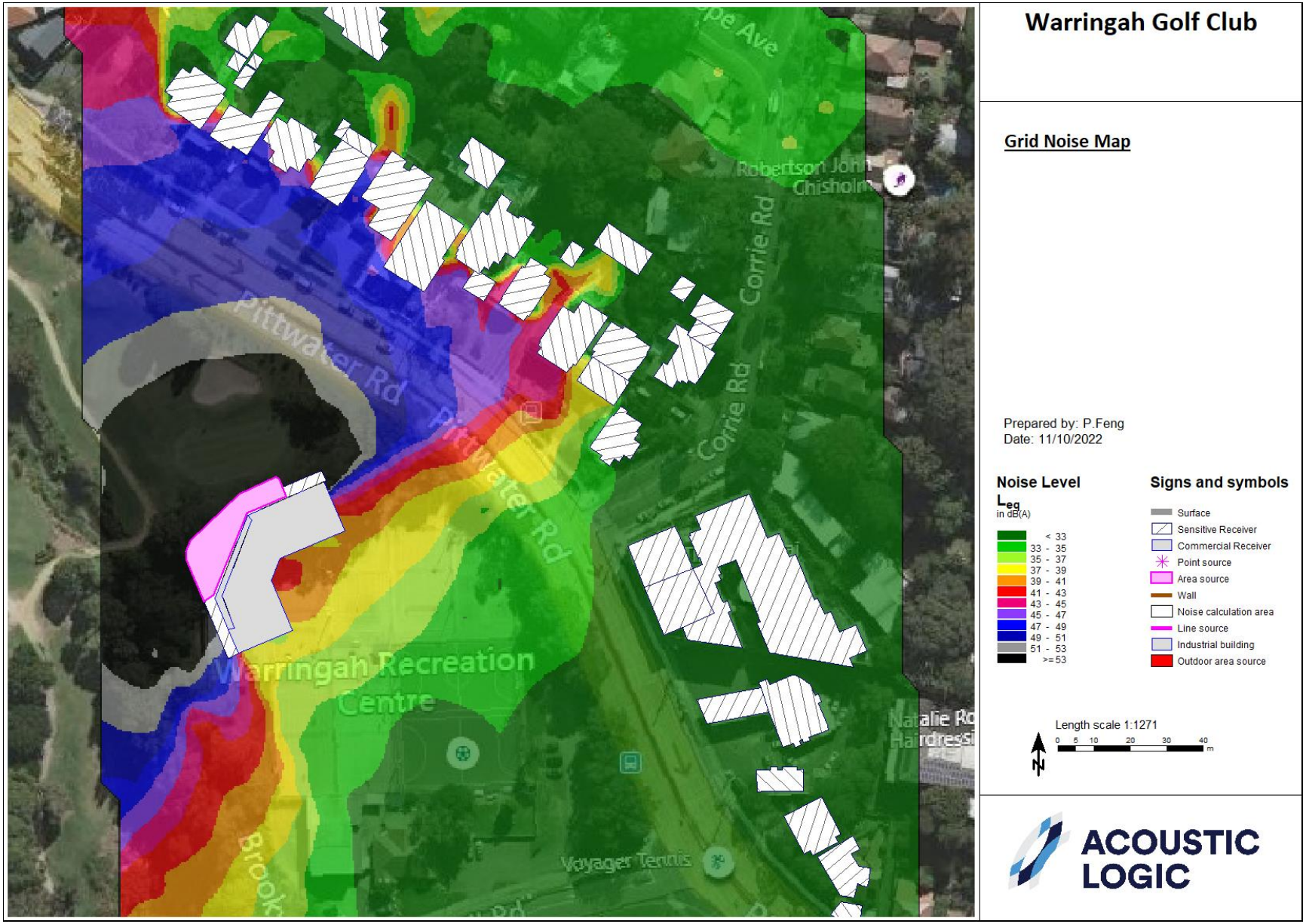


Figure 3 – Soundplan modelling results, grid noise map at 1.5m from Ground RL

6.1.2 Summarised Predicted Noise Levels at Surrounding Receivers

Assessment of noise emissions against the relevant acoustic criteria for all nearby commercial development is presented in the following tables. Predicted noise levels factor in losses due to distance and barrier effects, calculated at the nearest affected facade.

Table 10 – Patron/Music Noise Emission to R1 (Worst affected façade, Externally)

	31.5 Hz	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	A-wt
Predicted Noise Level Day & Evening 7am-10pm dB(A)L_{10}	38	38	40	42	45	47	42	25	17	50
Noise Emission Goal Day 7am-6pm (BG + 5)	**60**	**61**	**56**	**53**	**50**	**53**	**49**	**40**	**29**	**56**
Compliance ?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Noise Emission Goal Evening 6pm-10pm (BG + 5)	**55**	**56**	**51**	**48**	**45**	**48**	**44**	**35**	**24**	**51**
Compliance ?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

6.2 PEAK NOISE FROM CAR PARK USAGE

Peak noise levels from the use of the car park have been predicted and assessed against the relevant noise criteria detailed in Section 5.3.3. Peak noise events have been assessed to determine the potential for sleep disturbance amongst the nearest residences to the development. The assessment has been conducted with reference to the following assumptions:

- During typical 15 min period, we assumed one car door slam. A sound power level of 95dB(A)L_{max} has been adopted for a car door slam.

Table 11 – Patron/Music Noise Emission to R1 (Worst affected façade, Externally)

Receiver	Predicted Noise Level – dB(A)L_{Max}	Criteria	Compliance?
R1 Residential houses to the north of the project site at 518-528 Pittwater Road, North Manly	45	61 dB(A)L_{Fmax}	Yes

Table Note:

1. An assessment of sleep disturbance from peak noise events emanating from carpark usage is only undertaken at residential receivers.

6.3 NOISE FROM MECHANICAL PLANT WITHIN PROPOSED SITE GENERALLY

Detailed plant selection and location has not been undertaken at this stage. Satisfactory levels will be achievable through appropriate plant selection, location and if necessary, standard acoustic treatments such as duct lining, acoustic silencers and enclosures.

Noise emissions from all mechanical services to the closest residential and commercial receivers should comply with the requirements of Section 5.5.

6.3.1 Preliminary Mechanical Treatment Advice

An indicative assessment of initial design of primary plant items is presented below.

- Refrigeration equipment:
    - Refrigeration plant is recommended to be located within enclosure plant rooms.
    - Noise screening (using either a dedicated noise screen or the building shell between the plant and noise sensitive buildings) is recommended. This will include blanking off any plant room louvres.
    - Night time operational speeds shall be restricted.
- Major fans (typically with a sound power over 85dB(A) – such as kitchen exhaust, major toilet exhaust and major relief air fans) may require acoustic treatment if located externally near sensitive receivers. It is recommended that axial (as opposed to roof mounted fans) are to be used as this will enable acoustic treatment to be incorporated within ductwork running to atmosphere and with attenuators if necessary. In addition to the location of the equipment, acoustic treatments to the major plant items may include silencers, treatment to ducting, time control, operational limitations, and vibration isolation.
- Supply and exhaust fans may be located within plant rooms or in rooftop plant areas. These units typically emit high noise levels and require acoustic treatment such as silencers and internal lined ductwork. Silencer requirements would be determined once fan selections have been completed.
- Other minor plant items, such as bathroom or kitchen exhaust fans, may also be required. These items typically emit relatively low noise levels and may require minimal acoustic treatment of a standard nature, such as internally lining of ductwork.

Cumulative assessment of both plant noise with other noise sources is recommended when conducting acoustic design of plant items. Compliance with EPA acoustic criteria (as set out in Section 5.3) will be achievable, provided that detailed acoustic review of plant items is undertaken once plant is selected, and acoustic treatments similar to those outlined above are adopted.

The above recommendations are indicative. Detailed acoustic review should be undertaken at CC stage to determine acoustic treatments to control noise emissions to satisfactory levels.

7 RECOMMENDATIONS

The following noise emission controls should be imposed for the proposed development:

- Operating hours for the licensed premises are not to exceed 7am – 10pm Monday to Sunday.
- Speakers for the proposed bar are to be vibration isolated from the building structure using Embelton NRD mounts or similar.
- Allowed a maximum of up to 320 patrons. The distribution of the patrons for each space are not to exceed the assumptions presented in Section 6.1.
- Music speakers within the internal spaces not to exceed a spatially averaged sound pressure level of 75dB(A) $L_{10.}$
- External disposal of bottles/waste should be done prior to 10:00pm, but not before 7am.
- Signs are to be displayed at the entrance of the development reminding patrons to minimise noise when departing the premise.
- It is recommended that the management keep a complaint register on site and that noise complaints are registered (if any) and what course of remedial action has been taken. This register should be stored on site and be accessible at all times.

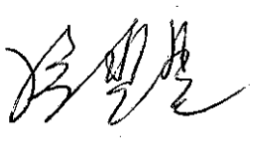
8 CONCLUSION

This report has been prepared to assess noise impacts associated with the new club house development as part of Warringah Golf Club located at 433 Pittwater Road, North Manly.

A soundplan model has been developed to predict the noise emission from patron and music from the proposed club. Provided that the recommendations in Section 7 of this report are adopted, noise emissions to all nearby development will be compliant with the noise emission guidelines.

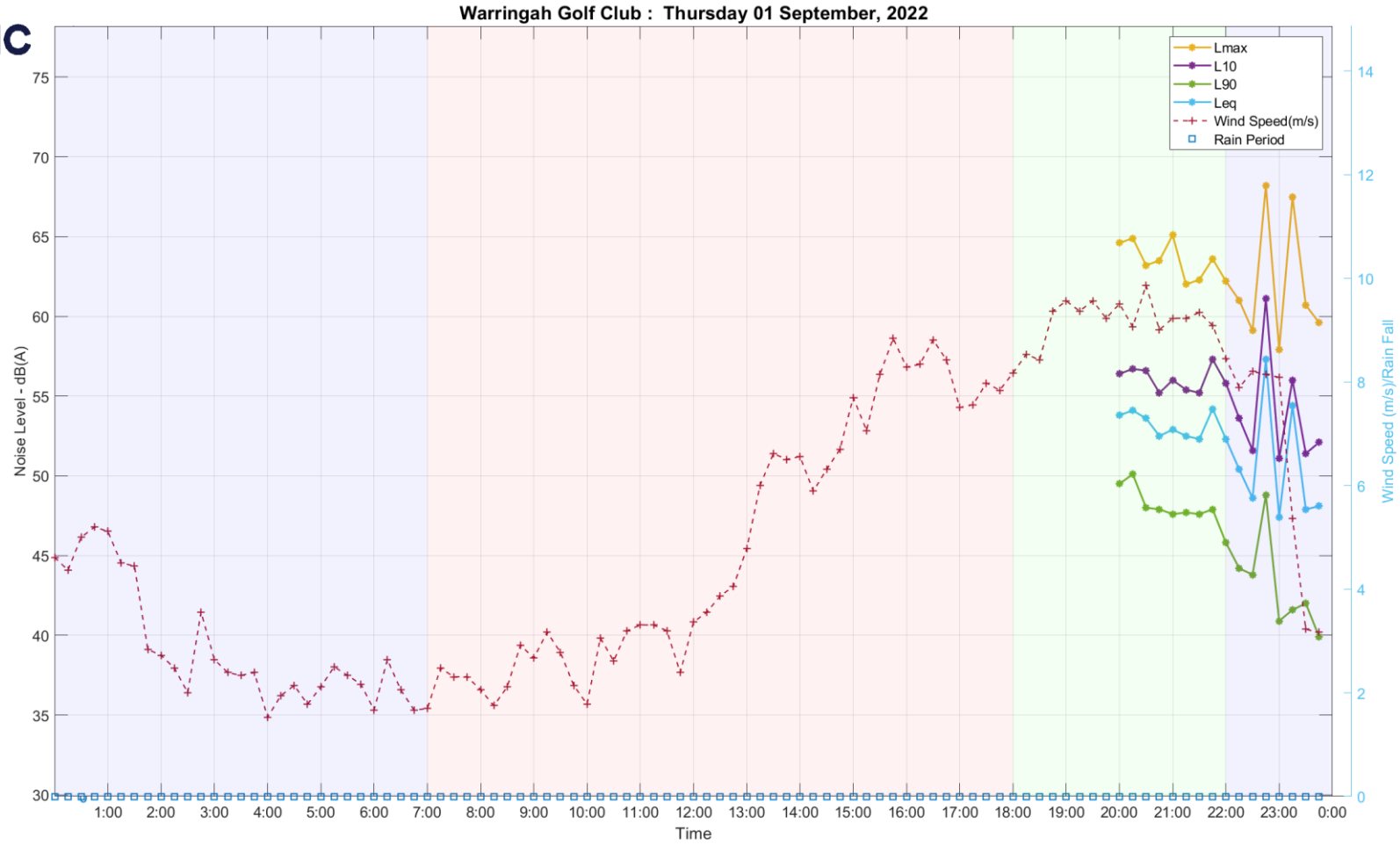
Please contact us should you have any further queries.

Yours faithfully,



Acoustic Logic Pty Ltd
PeiPei Feng

APPENDIX A – UNATTENDED NOISE MONITORING DATA


Warringah Golf Club : Thursday 01 September, 2022
Lmax
L10
L90
Leq
Wind Speed(m/s)
Rain Period
Noise Level - dB(A)
Wind Speed (m/s)/Rain Fall
Time
75
70
65
60
55
50
45
40
35
30
14
12
10
8
6
4
2
0
1:00
2:00
3:00
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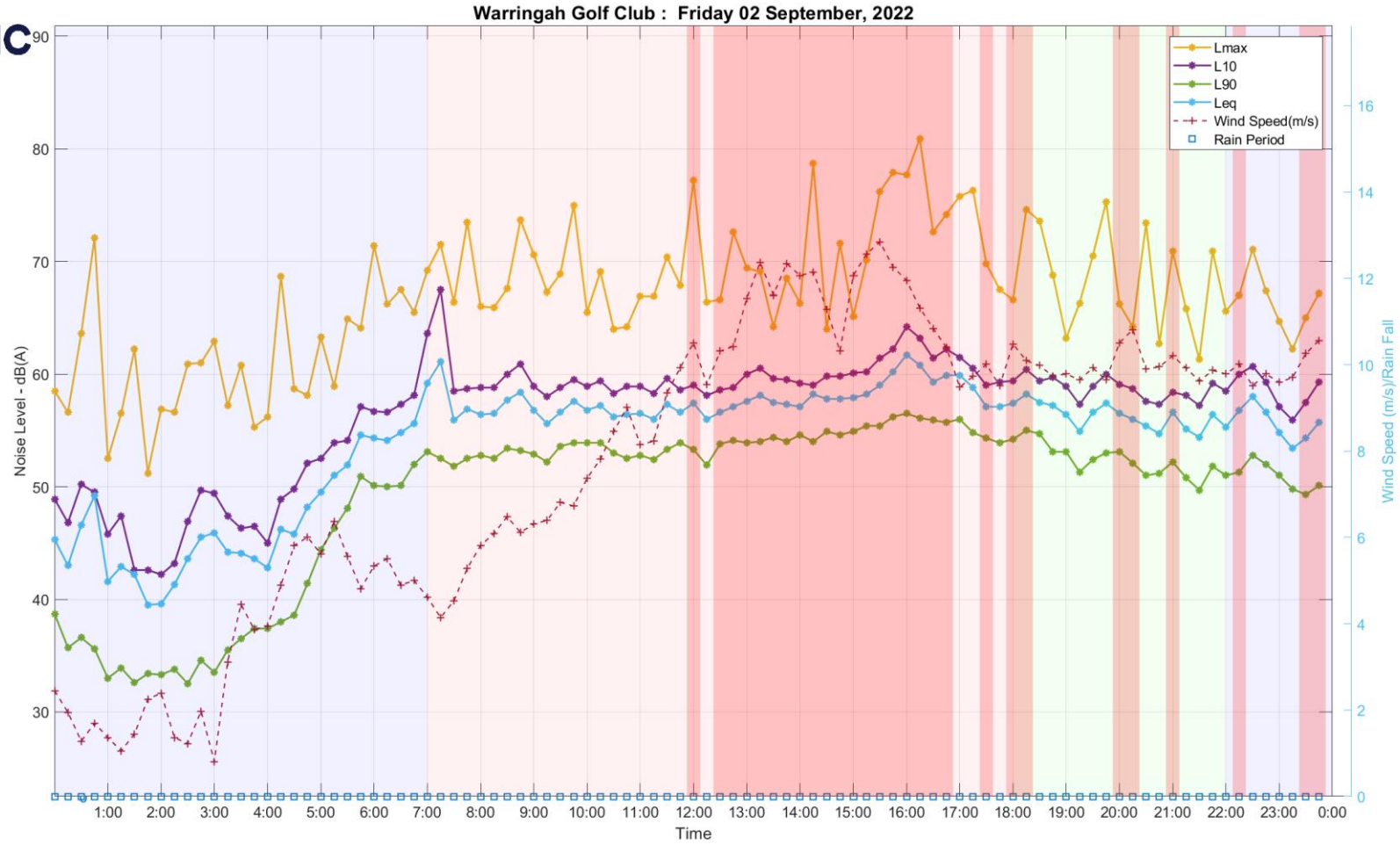
Warringah Golf Club : Friday 02 September, 2022
Lmax
L10
L90
Leq
Wind Speed(m/s)
Rain Period
Noise Level - dB(A)
Wind Speed (m/s)/Rain Fall
Time
90
80
70
60
50
40
30
16
14
12
10
8
6
4
2
0
1:00
2:00
3:00
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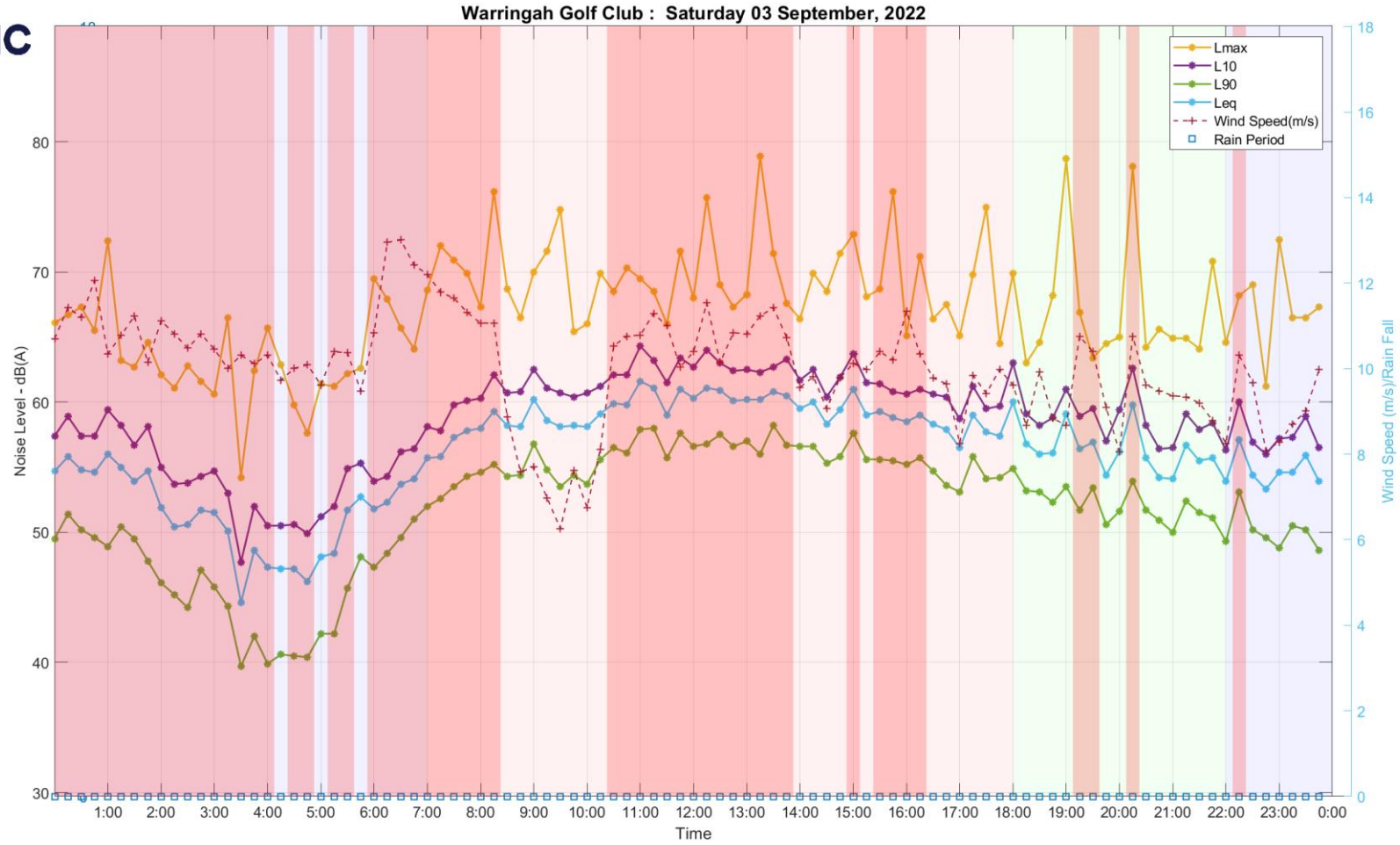
Warringah Golf Club : Saturday 03 September, 2022
Lmax
L10
L90
Leq
Wind Speed(m/s)
Rain Period
Noise Level - dB(A)
Wind Speed (m/s)/Rain Fall
Time
80
70
60
50
40
30
18
16
14
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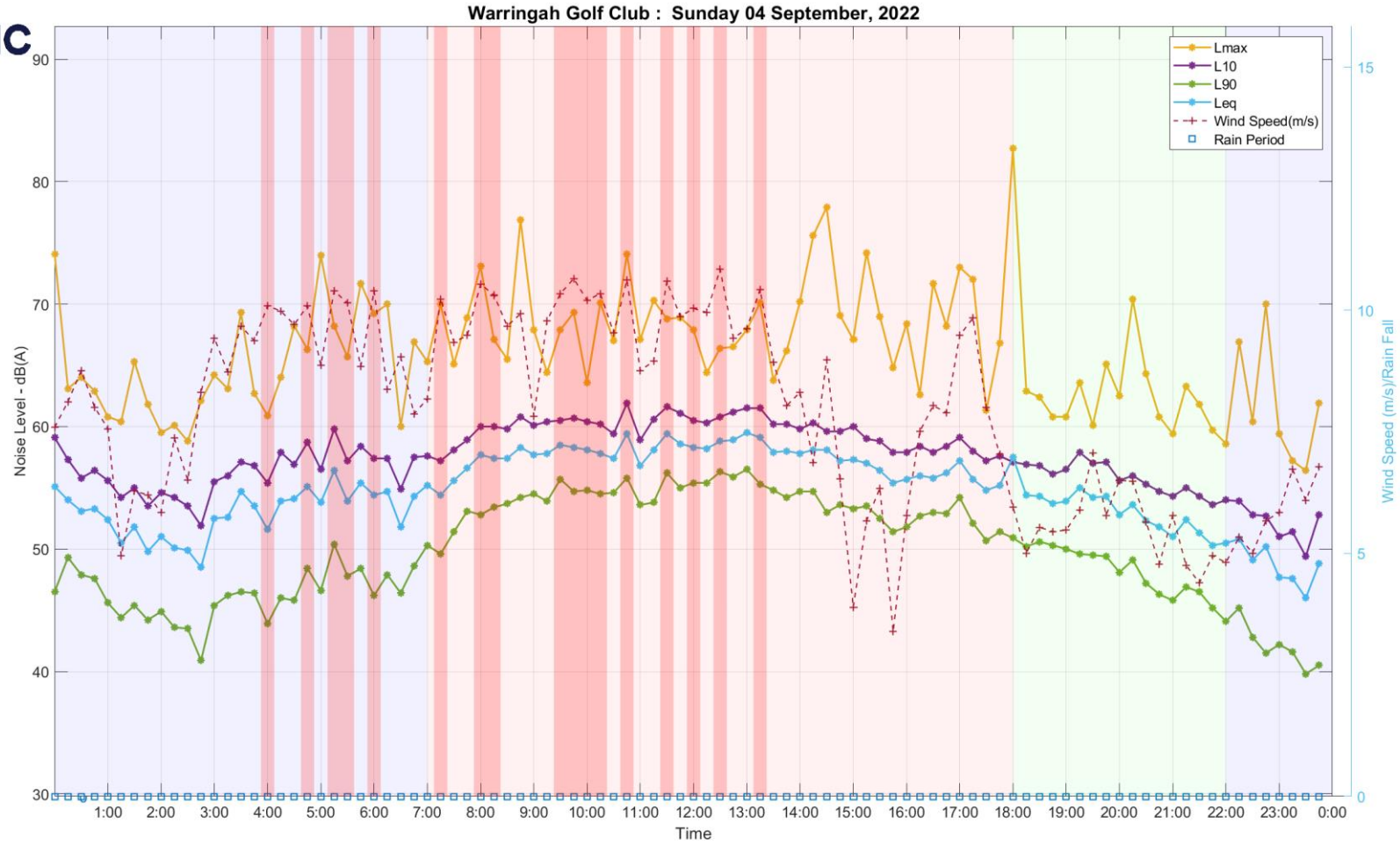
Warringah Golf Club : Sunday 04 September, 2022
Lmax
L10
L90
Leq
Wind Speed(m/s)
Rain Period
Noise Level - dB(A)
Wind Speed (m/s)/Rain Fall
Time
90
80
70
60
50
40
30
15
10
5
0
1:00
2:00
3:00
4:00
5:00
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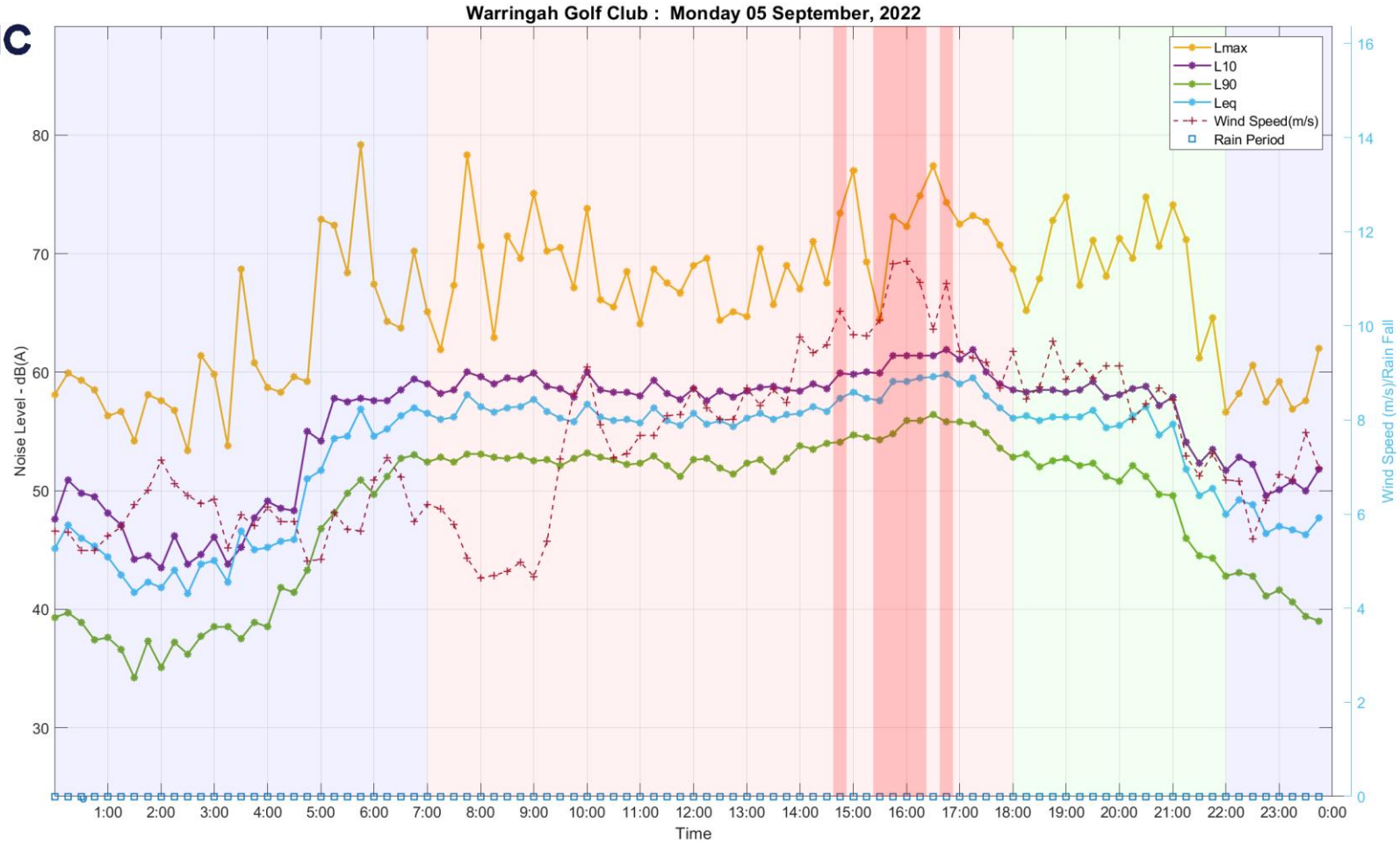
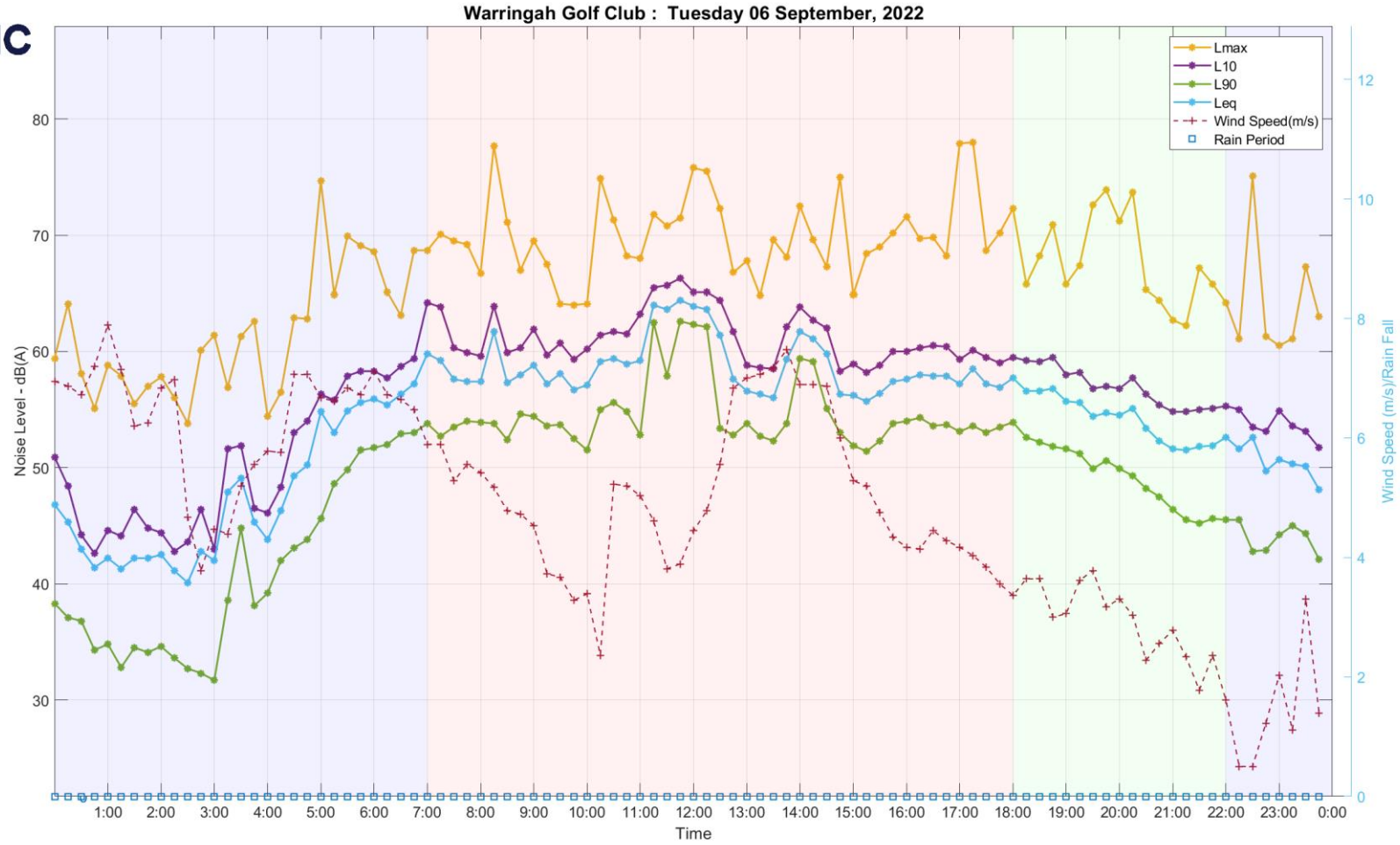
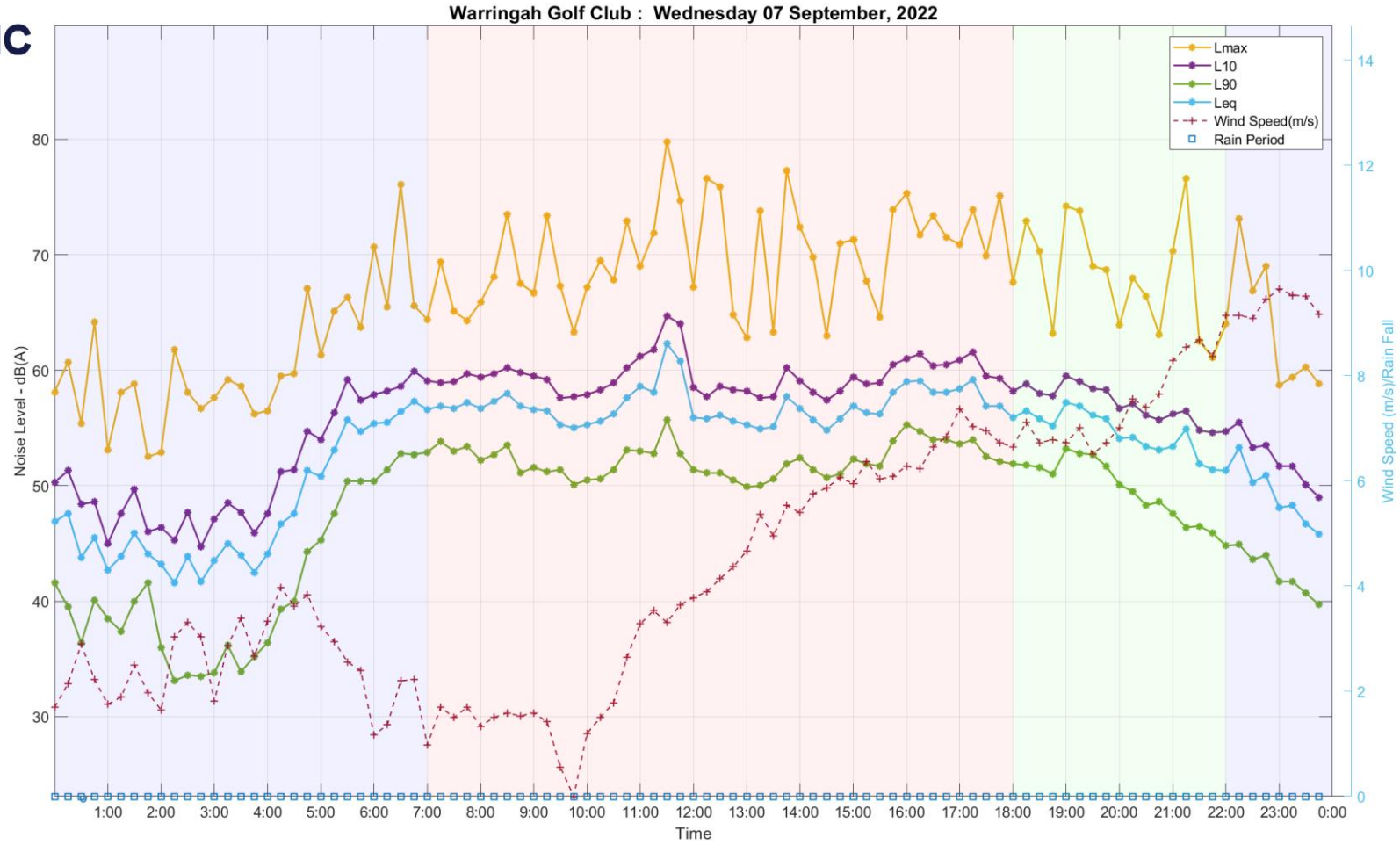
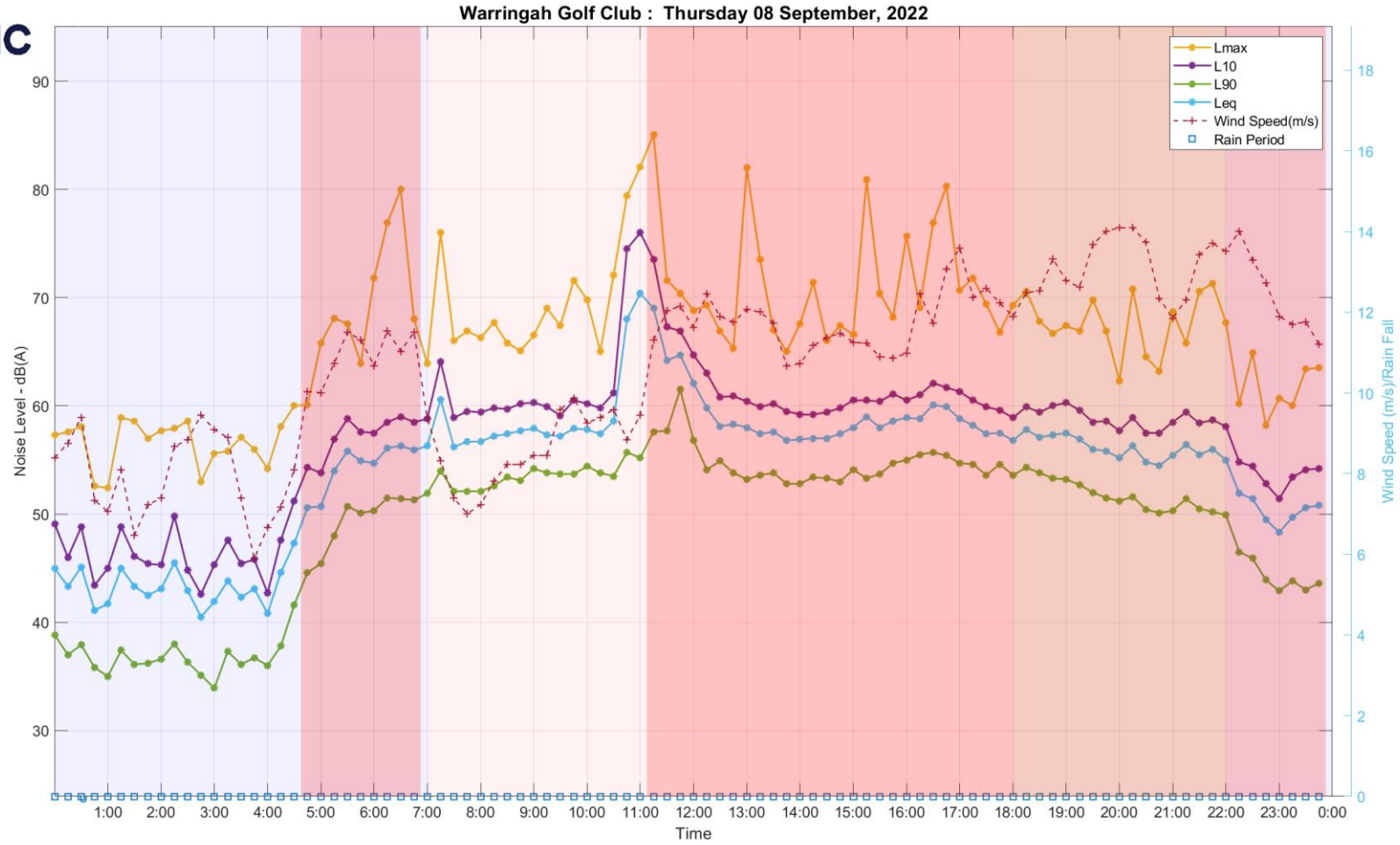
23:00
0:00


Warringah Golf Club : Monday 05 September, 2022
Lmax
L10
L90
Leq
Wind Speed(m/s)
Rain Period
Noise Level - dB(A)
Wind Speed (m/s)/Rain Fall
Time
80
70
60
50
40
30
16
14
12
10
8
6
4
2
0
1:00
2:00
3:00
4:00
5:00
6:00
7:00
8:00
9:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
20:00
21:00
22:00
23:00
0:00


Warringah Golf Club : Tuesday 06 September, 2022
Lmax
L10
L90
Leq
Wind Speed(m/s)
Rain Period
Noise Level - dB(A)
Wind Speed (m/s)/Rain Fall
Time
80
70
60
50
40
30
12
10
8
6
4
2
0
1:00
2:00
3:00
4:00
5:00
6:00
7:00
8:00
9:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
20:00
21:00
22:00
23:00
0:00


Warringah Golf Club : Wednesday 07 September, 2022
Lmax
L10
L90
Leq
Wind Speed(m/s)
Rain Period
Noise Level - dB(A)
Wind Speed (m/s)/Rain Fall
Time
80
70
60
50
40
30
14
12
10
8
6
4
2
0
1:00
2:00
3:00
4:00
5:00
6:00
7:00
8:00
9:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
20:00
21:00
22:00
23:00
0:00


Warringah Golf Club : Thursday 08 September, 2022
Lmax
L10
L90
Leq
Wind Speed(m/s)
Rain Period
Noise Level - dB(A)
Wind Speed (m/s)/Rain Fall
Time
90
80
70
60
50
40
30
18
16
14
12
10
8
6
4
2
0
1:00
2:00
3:00
4:00
5:00
6:00
7:00
8:00
9:00
10:00
11:00
12:00
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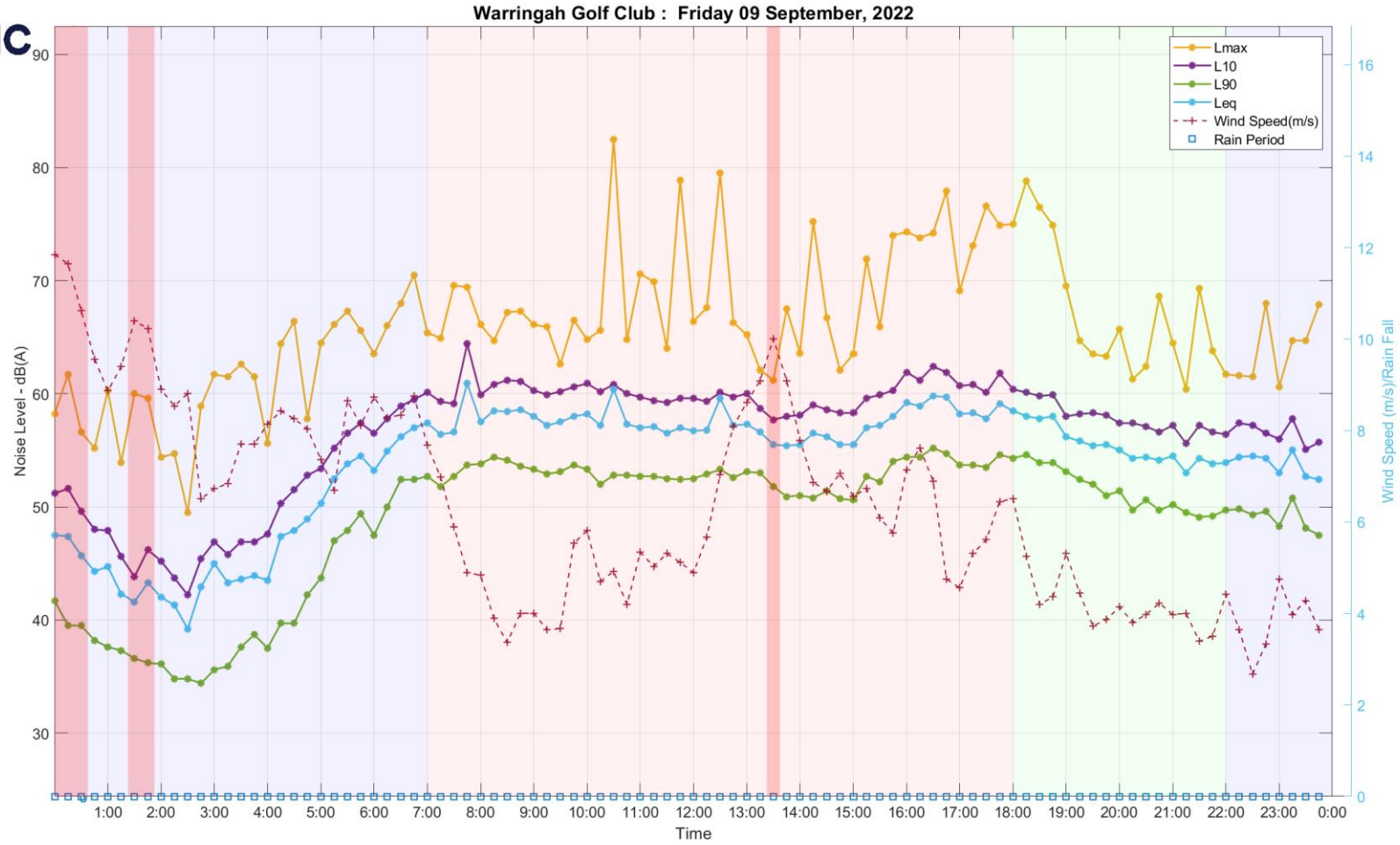
18:00
19:00
20:00
21:00
22:00
23:00
0:00


Warringah Golf Club : Friday 09 September, 2022
Lmax
L10
L90
Leq
Wind Speed(m/s)
Rain Period
Noise Level - dB(A)
Wind Speed (m/s)/Rain Fall
Time
90
80
70
60
50
40
30
16
14
12
10
8
6
4
2
0
1:00
2:00
3:00
4:00
5:00
6:00
7:00
8:00
9:00
10:00
11:00
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15:00
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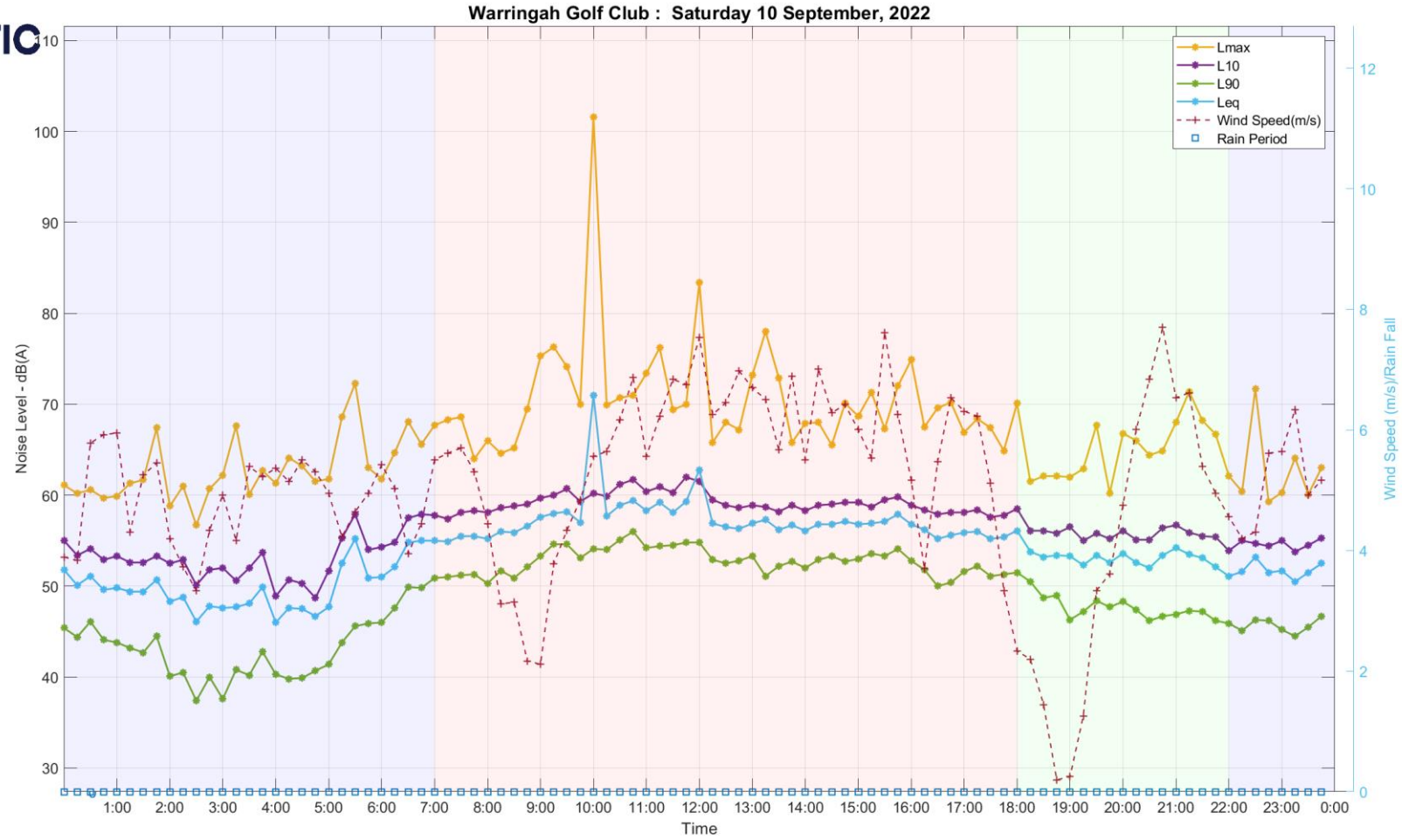
18:00
19:00
20:00
21:00
22:00
23:00
0:00


Warringah Golf Club : Saturday 10 September, 2022
Lmax
L10
L90
Leq
Wind Speed(m/s)
Rain Period
Noise Level - dB(A)
Wind Speed (m/s)/Rain Fall
Time
110
100
90
80
70
60
50
40
30
12
10
8
6
4
2
0
1:00
2:00
3:00
4:00
5:00
6:00
7:00
8:00
9:00
10:00
11:00
12:00
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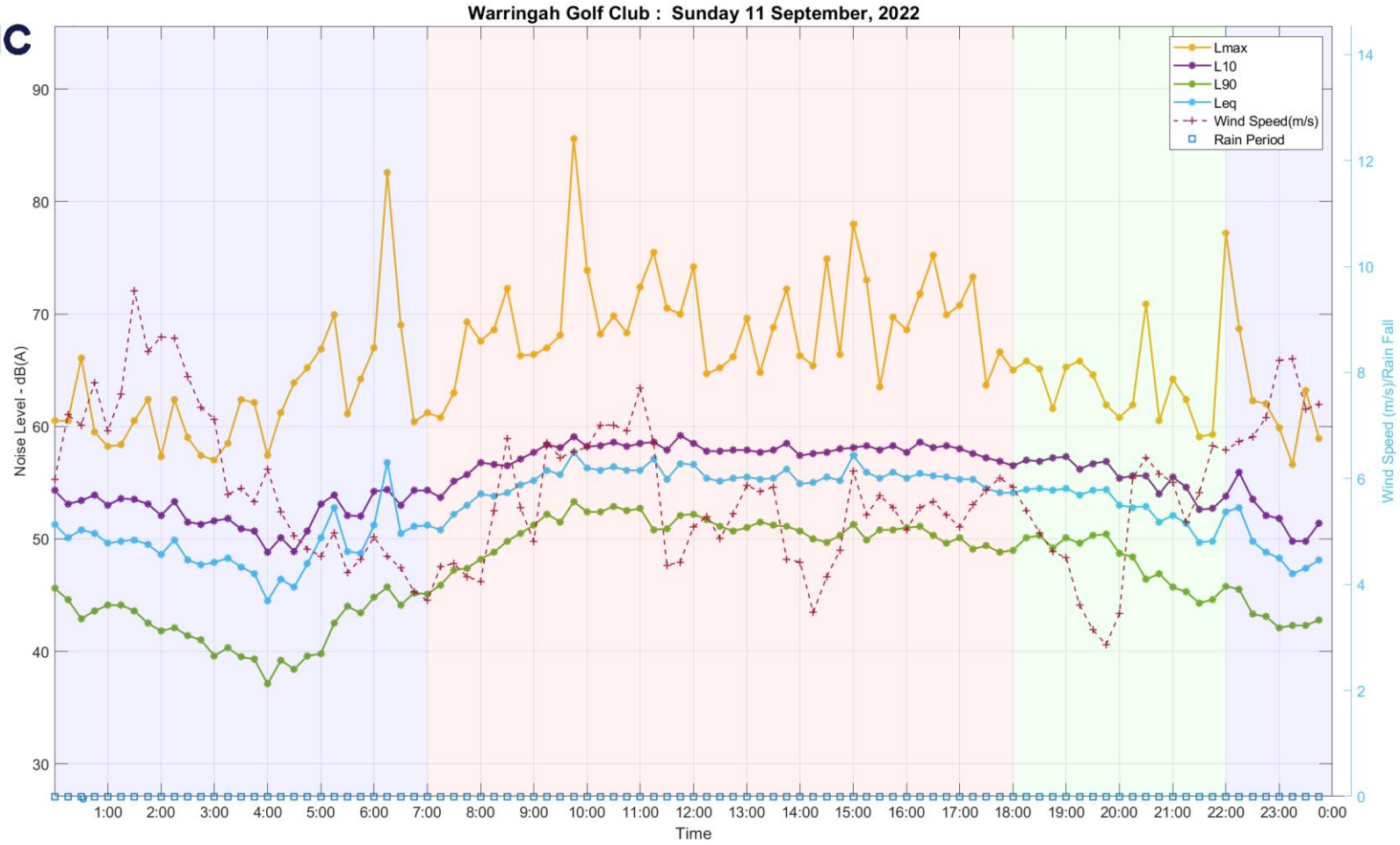
19:00
20:00
21:00
22:00
23:00
0:00


Warringah Golf Club : Sunday 11 September, 2022
Lmax
L10
L90
Leq
Wind Speed(m/s)
Rain Period
Noise Level - dB(A)
Wind Speed (m/s)/Rain Fall
Time
90
80
70
60
50
40
30
14
12
10
8
6
4
2
0
1:00
2:00
3:00
4:00
5:00
6:00
7:00
8:00
9:00
10:00
11:00
12:00
13:00
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16:00
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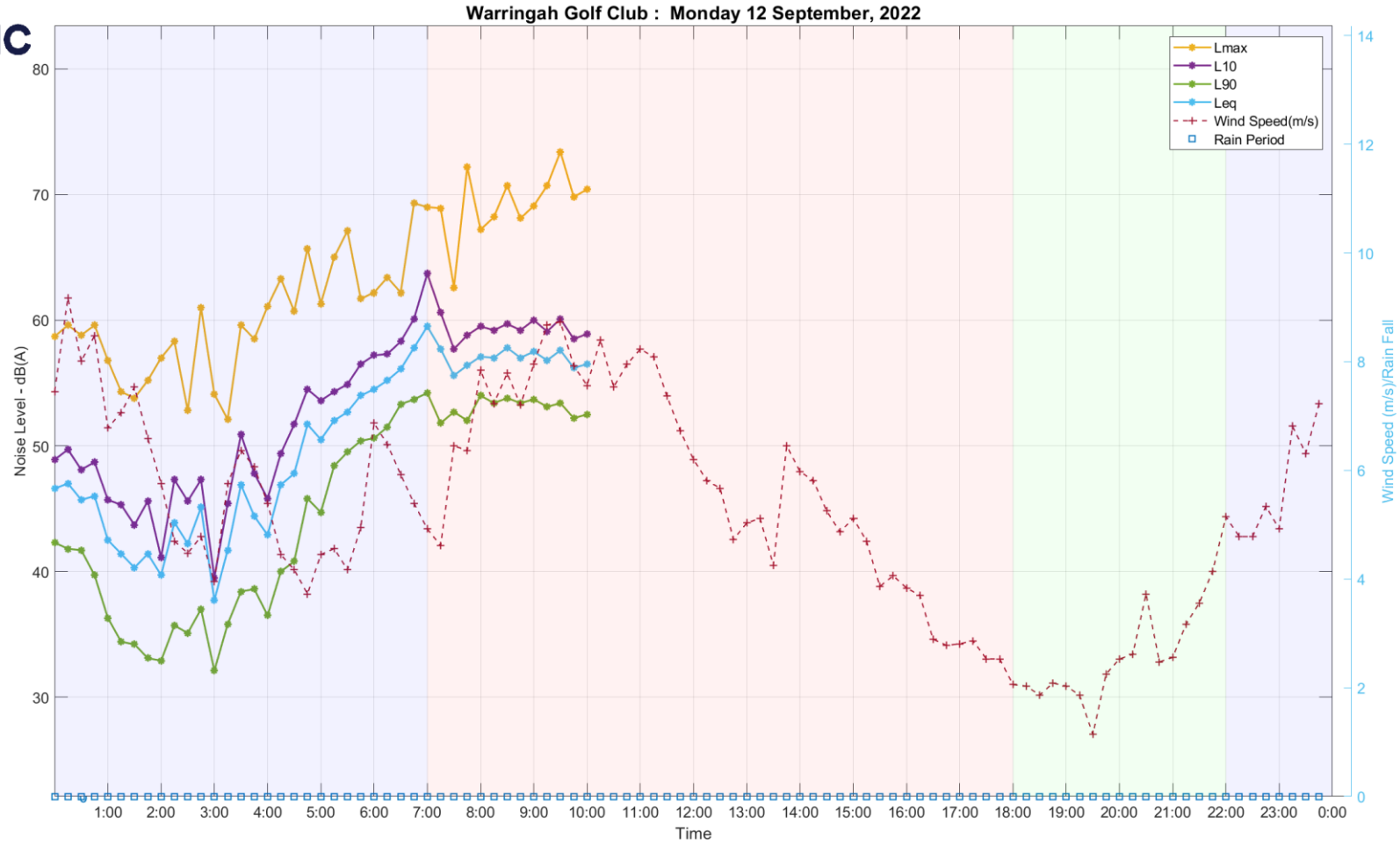
20:00
21:00
22:00
23:00
0:00


Warringah Golf Club : Monday 12 September, 2022
Lmax
L10
L90
Leq
Wind Speed(m/s)
Rain Period
Noise Level - dB(A)
Wind Speed (m/s)/Rain Fall
Time
80
70
60
50
40
30
14
12
10
8
6
4
2
0
1:00
2:00
3:00
4:00
5:00
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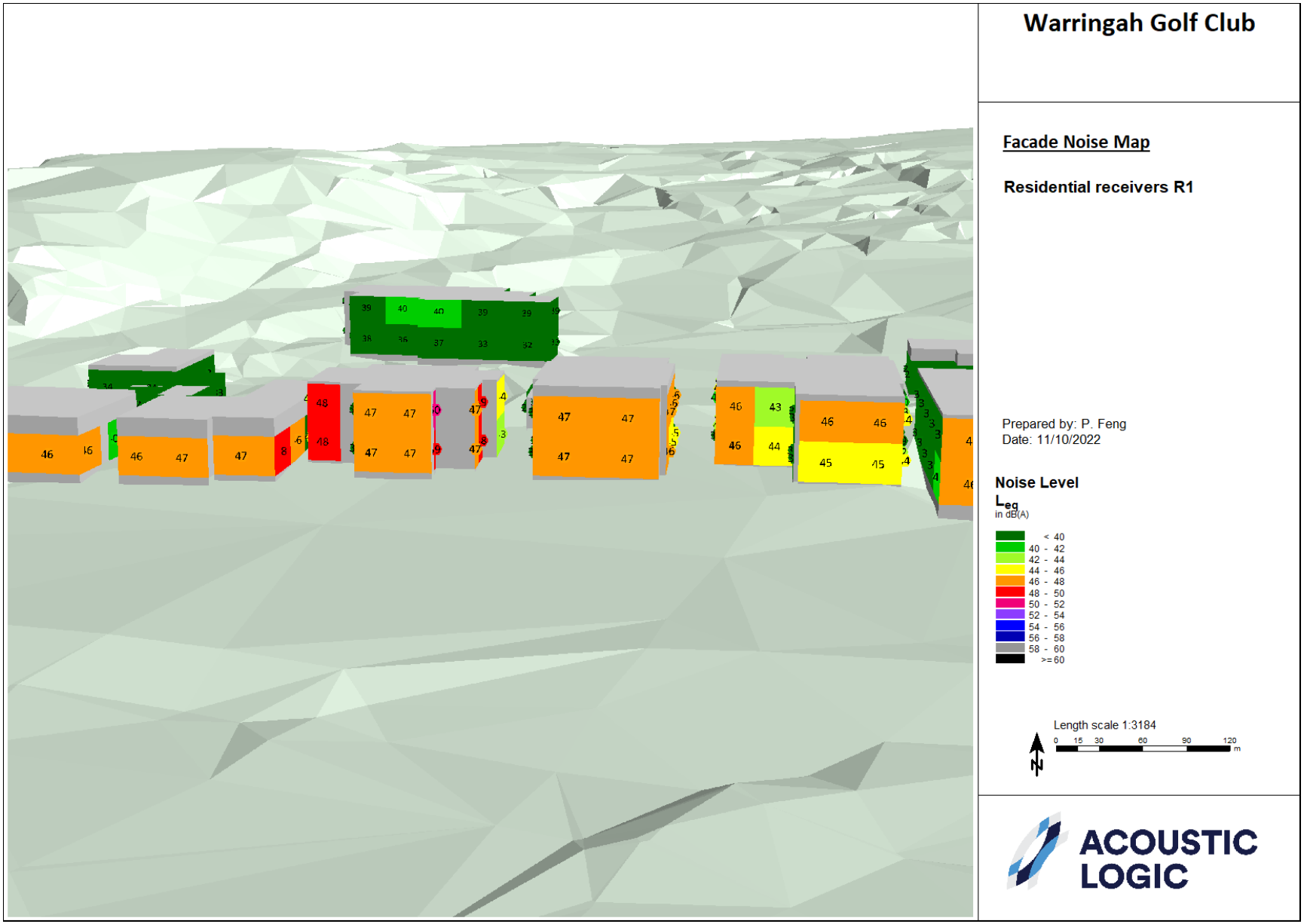
APPENDIX B – SOUNDPLAN MODELLING RESULTS

Façade noise map – R1



Façade noise map – C1